

**2003-0694.02**

**CLAIMS**

What is claimed is:

1. A printhead for an ink jet printer, the printhead comprising:
  - a semiconductor substrate containing at least one ink feed edge and a plurality of ink ejection actuators spaced a distance from the ink feed edge, each of the ink ejection actuators having an aspect ratio ranging from about 1.5:1 to about 6:1;
  - a thick film layer attached to the semiconductor substrate, the thick film layer having formed therein a plurality of ink feed chambers and ink feed channels corresponding to the plurality of ink ejection actuators; and
  - a nozzle plate attached to the thick film layer, the nozzle plate containing a plurality of nozzle holes in the nozzle plate corresponding to the plurality of ink feed chambers,wherein adjacent ones of the nozzle holes are spaced apart with a pitch ranging from about 600 to about 2400 dpi and wherein the distance from the ink feed edge is substantially the same for each of the ink ejection actuators.
2. The printhead of claim 1, wherein the ink ejection actuators comprise heater resistors.
3. The printhead of claim 2, wherein the heater resistors have a width of less than or equal to 15 microns.
4. The printhead of claim 2, wherein the heater resistors have a resistance ranging from about 80 to about 200 ohms.
5. The printhead of claim 1, wherein the nozzle holes comprise oblong nozzle holes having a long axis to diameter ratio greater than about 1.15.

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6. The printhead of claim 1, wherein the ink feed edge comprises an ink feed slot, and wherein the plurality of ink ejection actuators are disposed on both sides of the ink feed slot.
7. The printhead of claim 1, wherein the ink feed edge comprises an ink feed slot, and wherein the semiconductor substrate contains two or more ink feed slots.
8. The printhead of claim 7, wherein the plurality of ink ejection actuators are disposed only on one side of each of the ink feed slots.
9. The printhead of claim 1, wherein a distance from the ink ejection actuators to an exit of the nozzle holes is greater than the pitch.
10. The printhead of claim 1, wherein a ratio of the pitch to a distance from the ink ejection actuators to an exit of the nozzle holes ranges from about 0.5 to about 1.5.
11. An ink jet printer cartridge containing the printhead of claim 8.
12. A printhead for an ink jet printer comprising:
  - a semiconductor substrate containing at least one ink feed edge and a plurality of ink ejection actuators spaced a distance from the ink feed edge, each of the ink ejection actuators having an aspect ratio ranging from about 1.5:1 to about 6:1; and
  - a nozzle plate attached to the semiconductor substrate, the nozzle plate containing a plurality of nozzle holes, ink chambers and ink channels laser ablated in the nozzle plate corresponding to the plurality of ink ejection actuators, wherein adjacent nozzle holes are spaced apart with a pitch ranging from about 600 to about 1200 dpi and wherein the distance from the ink feed edge is substantially the same for each of the ink ejection actuators.

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13. The printhead of claim 12, wherein ejection actuators comprise heater resistors and the heater resistors have a resistance ranging from about 80 to about 200 ohms.
14. The printhead of claim 12, wherein the nozzle holes comprise bicircular nozzle holes.
15. The printhead of claim 12, wherein the ink feed edge comprises an ink feed slot, and wherein the plurality of ink ejection actuators are disposed on both sides of the ink feed slot.
16. The printhead of claim 12, wherein the ink feed edge comprises an ink feed slot, and wherein the semiconductor substrate contains two or more ink feed slots.
17. The printhead of claim 16, wherein the plurality of ink ejection actuators are disposed only on one side of each of the ink feed slots.
18. An ink jet printer cartridge containing the printhead of claim 15.
19. An ink jet printer cartridge containing the printhead of claim 16.
20. A printhead for a thermal ink jet printer, the printhead comprising:
  - a semiconductor substrate containing at least one ink feed edge and a plurality of heater resistors spaced a distance from the ink feed edge, each of the heater resistors having a resistance ranging from about 80 to about 200 ohms;
  - a thick film layer attached to the semiconductor substrate, the thick film layer having formed therein a plurality of ink feed chambers and ink feed channels corresponding to the plurality of ink ejection actuators; and
  - a nozzle plate attached to the thick film layer, the nozzle plate containing a plurality of nozzle holes in the nozzle plate corresponding to the plurality of ink feed chambers,

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- wherein adjacent nozzle holes are spaced apart with a pitch ranging from about 600 to about 2400 dpi and wherein the distance from the ink feed edge is substantially the same for each of the heater resistors.
21. The printhead of claim 20 wherein each of the heater resistors has an aspect ratio ranging from about 1.5:1 to about 6:1.
22. The printhead of claim 20, wherein the ink feed edge comprises an ink feed slot, and wherein the plurality of heater resistors are disposed on both sides of the ink feed slot.
23. The printhead of claim 20, wherein the ink feed edge comprises an ink feed slot, and wherein the semiconductor substrate contains two or more ink feed slots.
24. The printhead of claim 23, wherein the plurality of heater resistors are disposed only on one side of each of the ink feed slots.
25. An ink jet printer cartridge containing the printhead of claim 20.
26. A printhead for a thermal ink jet printer, the printhead comprising:
- a semiconductor substrate containing at least one ink feed edge and a plurality of heater resistors spaced a distance from the ink feed edge, each of the heater resistors having a resistance ranging from about 80 to about 200 ohms;
  - a nozzle plate attached to the semiconductor substrate, the nozzle plate containing a plurality of nozzle holes, ink chambers and ink channels laser ablated in the nozzle plate corresponding to the plurality of ink ejection actuators,
- wherein adjacent nozzle holes are spaced apart with a pitch ranging from about 600 to about 1200 dpi and wherein the distance from the ink feed edge is substantially the same for each of the heater resistors.

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27. The printhead of claim 26 wherein each of the heater resistors has an aspect ratio ranging from about 1.5:1 to about 6:1.
28. The printhead of claim 26, wherein the ink feed edge comprises an ink feed slot, and wherein the plurality of heater resistors are disposed on both sides of the ink feed slot.
29. The printhead of claim 26, wherein the ink feed edge comprises an ink feed slot, and wherein the semiconductor substrate contains two or more ink feed slots.
30. The printhead of claim 29, wherein the plurality of heater resistors are disposed only on one side of each of the ink feed slots.
31. An ink jet printer cartridge containing the printhead of claim 26.